IN THE CLAIMS:

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~strikethrough~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

Please AMEND claims 1, 21, 26, 32 and 36 in accordance with the following:

1. (Currently Amended) A method of correcting image alignment errors in an ink-jet printer which has a printhead and performs a printing operation by ejecting ink from the printhead according to a variety of printing modes, the method comprising:

printing a reference line, a first comparison line, and a second comparison line;

calculating image alignment errors by measuring a first distance between the reference line and the first comparison line and a second distance between the reference line and the second comparison line; and

obtaining a straight line equation determined according to the first distance and the second distance and calculating a predetermined control value correcting the calculated image alignment errors by using the obtained straight line equation.~~;~~

wherein the image alignment errors are corrected by controlling ink ejection using the calculated predetermined control value.

2. (Original) The method of claim 1, wherein the printing the reference line, the first comparison line, and the second comparison line comprises:

printing a vertical reference line at a first position on a sheet of paper by a first control value used to control ink ejection according to a first printing mode;

printing a first vertical comparison line at a second position on the sheet of paper separated from the vertical reference line printed at the first position by a first predetermined distance, by a second control value used to control ink ejection according to a second printing mode; and

printing a second vertical comparison line at a third position on the sheet of paper separated from the vertical reference line printed at the first position by a second predetermined distance, by a third control value used to control ink ejection according to the second printing mode.

3. (Original) The method of claim 2, wherein the first vertical comparison line and the second vertical comparison line are printed in the same direction as or in a direction opposite to the direction of the vertical reference line.

4. (Original) The method of claim 2, wherein the first vertical comparison line and the second vertical comparison line are printed on one side of the vertical reference line.

5. (Original) The method of claim 2, wherein the first vertical comparison line and the second vertical comparison line are printed on both sides of the vertical reference line.

6. (Original) The method of claim 2, wherein the calculating image alignment errors by measuring the first distance and the second distance comprises:

measuring a first actual distance between the vertical reference line and the first vertical comparison line and a second actual distance between the vertical reference line and the second vertical comparison line; and

obtaining a first alignment error on a horizontal axis by subtracting the first predetermined distance from the first actual distance and obtaining a second alignment error on the horizontal axis by subtracting the second predetermined distance from the second actual distance.

7. (Original) The method of claim 6, wherein the measuring the first and second actual distances comprises:

sensing the vertical reference line, the first vertical comparison line, and the second vertical comparison line and detecting corresponding times where the vertical reference line, the first vertical comparison line, and the second vertical comparison line are sensed; and

calculating the first actual distance by multiplying a time difference between the time when the sensed vertical reference line is detected and the time when the first sensed vertical comparison line is detected, by a moving speed on the horizontal axis of the printhead, and calculating the second actual distance by multiplying a time difference between the time when the sensed vertical reference line is detected and the time when the second sensed vertical comparison line is detected, by the moving speed on the horizontal axis of the printhead.

8. (Original) The method of claim 6, wherein the calculating the predetermined control value comprises:

obtaining a first straight line equation in which the second control value and the first alignment error on the horizontal axis are used as a first coordinate value and the third control value and the second alignment error on the horizontal axis are used as a second coordinate value; and

obtaining the predetermined control value correcting alignment errors on the horizontal axis from the first straight line equation.

9. (Original) The method of claim 8, wherein, the first straight line equation is obtained using the following Equation:

$$y = (y_2 - y_1)(x - x_1)/(x_2 - x_1) + y_1 = (y_2 - y_1)(x - x_2)/(x_2 - x_1) + y_2$$

where x is the predetermined control value, y are alignment errors on the horizontal axis according to a variation of the predetermined control value, x_1 is the second control value, x_2 is the third control value, y_1 is the first alignment error on the horizontal axis, and y_2 is the second alignment error on the horizontal axis.

10. (Original) The method of claim 9, wherein x, corresponding to the predetermined control value when y equals 0 so that the alignment errors on the horizontal axis do not occur, is obtained using the following Equation:

$$x = (x_1 \times y_2 - x_2 \times y_1)/(y_2 - y_1).$$

11. (Original) The method of claim 1, wherein the printing the reference line, the first comparison line, and the second comparison line comprises:

printing a horizontal reference line at a fourth position on a sheet of paper by a fourth control value used to control ink ejection according to a third printing mode;

printing a first horizontal comparison line at a fifth position on the sheet of paper separated from the horizontal reference line printed at the fourth position by a third predetermined distance that is virtually set, by a fifth control value used to control ink ejection according to a fourth printing mode; and

printing a second horizontal comparison line at a sixth position on the sheet of paper separated from the horizontal reference line printed at the fourth position by a fourth predetermined distance that is virtually set, by a sixth control value used to control ink ejection

according to the fourth printing mode.

12. (Original) The method of claim 11, wherein the first horizontal comparison line and the second horizontal comparison line are printed using a different printhead from a printhead for printing the horizontal reference line.

13. (Original) The method of claim 11, wherein the first horizontal comparison line and the second horizontal comparison line are printed on one side of the horizontal reference line.

14. (Original) The method of claim 11, wherein the first horizontal comparison line and the second horizontal comparison line are printed on both sides of the horizontal reference line.

15. (Original) The method of claim 11, wherein the calculating image alignment errors by measuring the first distance and the second distance comprises:

measuring a third actual distance between the horizontal reference line and the first horizontal comparison line and a fourth actual distance between the horizontal reference line and the second horizontal comparison line; and

obtaining first alignment errors on a vertical axis by subtracting the third predetermined distance from the third actual distance and obtaining second alignment errors on the vertical axis by subtracting the fourth predetermined distance from the fourth actual distance.

16. (Original) The method of claim 15, wherein the measuring the third and fourth actual distances comprises:

sensing the horizontal reference line, the first horizontal comparison line, and the second horizontal comparison line and detecting corresponding times when the horizontal reference line, the first horizontal comparison line, and the second horizontal comparison line are sensed; and

calculating the third actual distance by multiplying a time difference between the time when the sensed horizontal reference line is detected and the time when the first sensed horizontal comparison line is detected, by a moving speed on the vertical axis of the printhead, and calculating the fourth actual distance by multiplying a time difference between the time when the sensed horizontal reference line is detected and the time when the second sensed horizontal comparison line is detected, by the moving speed on the vertical axis of the printhead.

17. (Original) The method of claim 15, wherein the calculating the predetermined control

value comprises:

obtaining a second straight line equation in which the fifth control value and the first alignment error on the vertical axis are used as a third coordinate value and the sixth control value and the second alignment error on the vertical axis are used as a fourth coordinate value; and

obtaining the predetermined control value for correcting alignment errors on the vertical axis from the second straight line equation.

18. (Original) The method of claim 17, wherein the second straight line equation is obtained using the following Equation:

$$y = (y_4 - y_3)(x - x_3)/(x_4 - x_3) + y_3 = (y_4 - y_3)(x - x_4)/(x_4 - x_3) + y_4$$

where x is the predetermined control value, y are alignment errors on the vertical axis according to a variation of the predetermined control value, x_3 is the fifth control value, x_4 is the sixth control value, y_3 is the first alignment error on the vertical axis, and y_4 is the second alignment error on the vertical axis.

19. (Original) The method of claim 18, wherein x, corresponding to the predetermined control value when y equals 0 so that the alignment errors on the vertical axis do not occur, is obtained using the following Equation:

$$x = (x_3 \times y_4 - x_4 \times y_3)/(y_4 - y_3).$$

20. (Original) The method of claim 1, wherein ink ejection is controlled by adjusting a starting point of the printhead, an ink dropping time or selection of nozzles of the printhead.

21. (Currently Amended) An apparatus for correcting image alignment errors in an ink-jet printer which has a printhead and performs a printing operation by ejecting ink from the printhead according to a variety of printing modes, the apparatus comprising:

a printing instruction unit, which outputs an instruction signal to print a first reference line, a first comparison line, and a second comparison line;

a printing unit, which prints the reference line, the first comparison line, and the second comparison line in response to the instruction signal;

an alignment error calculation unit, which calculates alignment errors by measuring a first distance between the reference line and the first comparison line and a second distance

between the reference line and the second comparison line; and

a control value calculation unit, which obtains a straight line equation determined according to the first distance and the second distance and calculates a predetermined control value for correcting the calculated image alignment errors by using the obtained straight line equation,

wherein the image alignment errors are corrected by controlling ink ejection using the calculated predetermined control value.

22. (Original) The apparatus of claim 21, wherein the printing instruction unit comprises:

a reference line printing instruction portion which outputs an instruction signal to print a vertical reference line at a first position on a sheet of paper in response to a first control value used to control ink ejection according to a first printing mode, or outputs the instruction signal to print a horizontal reference line at a fourth position on the sheet of paper in response to a fourth control value used to control ink ejection according to a third printing mode;

a first comparison line printing instruction portion which outputs a first comparison line printing instruction signal to print a first vertical comparison line at a second position on the sheet of paper separated from the vertical reference line printed at the first position by a first predetermined distance, in response to a second control value used to control ink ejection according to a second printing mode, or outputs the first comparison line printing instruction signal to print a first horizontal comparison line at a fifth position of the sheet of paper separated from the horizontal reference line printed at the fourth position by a third predetermined distance, in response to a fifth control value used to control ink ejection according to a fourth printing mode; and

a second comparison line printing instruction portion, which first comparison line printing to print a second vertical comparison line at the third position on the sheet of paper separated from the vertical reference line printed at the first position by a second predetermined distance that is virtually set, in response to a third control value used to control ink ejection according to the second printing mode, or instructs to print a second horizontal comparison line at a sixth position of the sheet of paper separated from the horizontal reference line printed at the fourth position by a fourth predetermined distance that is virtually set, in response to a sixth control value used to control ink ejection according to the fourth printing mode and outputs an instruction result as a second comparison line printing instruction signal.

23. (Original) The apparatus of claim 22, wherein the alignment error calculation unit

comprises:

an actual distance measurement portion, which measures a first actual distance between the vertical reference line and the first vertical comparison line and a second actual distance between the vertical reference line and the second vertical comparison line, or measures a third actual distance between the horizontal reference line and the first horizontal comparison line and a fourth actual distance between the horizontal reference line and the fourth horizontal comparison line and outputs a measuring result as an actual distance measurement signal; and

an error detection portion, which obtains first alignment errors on the horizontal axis by subtracting the first predetermined distance from the first actual distance and obtains second alignment errors on the horizontal axis by subtracting the second predetermined distance from the second actual distance, or obtains first alignment errors on the vertical axis by subtracting the third predetermined distance from the third actual distance and obtains second alignment errors on the vertical axis by subtracting the fourth predetermined distance from the fourth actual distance and outputs obtained alignment errors.

24. (Original) The apparatus of claim 23, wherein the actual distance measurement unit comprises:

an image sensing part, which senses the vertical reference line, the first vertical comparison line, the second vertical comparison line, the horizontal reference line, the first horizontal comparison line, and the second horizontal comparison line and outputs a corresponding sensing result;

an image sensed time detection part, which detects sensing times of the corresponding sensing result of the image sensing part and outputs detected times;

a moving speed detection part, which detects a moving speed on a horizontal axis or a vertical axis of the printhead and outputs the detected moving speed; and

a distance calculation part, which calculates the first actual distance by multiplying a time difference between a time when the sensed vertical reference line is detected and a time when the first sensed vertical comparison line is detected, by the detected moving speed on the horizontal axis, and calculates the second actual distance by multiplying a time difference between a time when the sensed vertical reference line is detected and a time when the second sensed vertical comparison line is detected, by the detected moving speed on the horizontal axis, or calculates the third actual distance by multiplying a time difference between a time when the sensed horizontal reference line is detected and a time when the first sensed horizontal comparison line is detected, by the detected moving speed on the vertical axis, and calculates

the fourth actual distance by multiplying a time difference between a time when the sensed horizontal reference line is detected and a time when the second sensed horizontal comparison line is detected, by the detected moving speed on the vertical axis and outputs a calculation result.

25. (Original) The apparatus of claim 24, wherein the control value calculation unit comprises:

a straight line equation calculation portion, which obtains a first straight line equation in which the second control value and first alignment error on the horizontal axis are used as a first coordinate value and the third control value and second alignment error on the horizontal axis are used as a second coordinate value, or obtains a second straight line equation in which the fifth control value and first alignment error on a vertical axis are used as a third coordinate value and the sixth control value and second alignment error on the vertical axis are used as a fourth coordinate value; and

a control value calculation portion, which obtains a predetermined control value correcting alignment errors on the horizontal axis from the first straight line equation, or obtains a predetermined control value correcting alignment errors on the vertical axis from the second straight line equation, and outputs an obtained predetermined control value.

26. (Currently Amended) An image alignment error correcting method comprising:

printing a reference line;

printing a first comparison line a first predetermined distance from the printed reference line;

printing a second comparison line a second predetermined distance from the printed reference line;

determining a first actual distance between the printed reference line and the printed first comparison line;

determining a second actual distance between the printed reference line and the printed second comparison line;

determining image alignment errors based upon a difference between the first predetermined distance and the first actual distance and a difference between the second predetermined distance and the second actual distance; and

obtaining a straight line equation determined according to the determined image alignment errors and determining a correcting control value to correct for the image alignment

error, based on the obtained straight line equation~~determined image alignment errors~~.

27. (Original) The method of claim 26, wherein the reference line, the first comparison line, and the second comparison line are vertically oriented.

28. (Original) The method of claim 26, wherein the reference line, the first comparison line, and the second comparison line are horizontally oriented.

29. (Original) The method of claim 26, wherein only one reference line, one first comparison line and one second comparison line are printed.

30. (Original) The method of claim 26, wherein the determining the first actual distance between the printed reference line and the printed first comparison line comprises:

determining a time difference of a printhead moving at a predetermined speed between the printed first comparison line and the printed reference line;

calculating the first actual distance based on the predetermined moving speed and the time difference.

31. (Original) The method of claim 30, wherein the determining the second actual distance between the printed reference line and the printed second comparison line comprises:

determining a time difference of a printhead moving at a predetermined speed between the printed second comparison line and the printed reference line; and

calculating the second actual distance based on the predetermined moving speed and the time difference.

32. (Currently Amended) An image alignment calibration device comprising:

a printing unit;

a controller to output signals to the printing unit to print a reference line at a first predetermined position, to print a first comparison line a first predetermined distance from the reference line and to print a second comparison line a second predetermined distance from the reference line in response to an image alignment correction request signal;

a distance determiner to determine a first actual distance between the printed first comparison line and the printed reference line and a second actual distance between the printed second comparison line and the printed reference line;

an error detector which outputs a first alignment error based on the difference between the first predetermined distance and the first actual distance and a second alignment error based on the difference between the second predetermined distance and the second actual distance; and

a control value calculator which obtains a straight line equation determined according to the first alignment error and the second alignment error and calculates an image correcting control value based on the obtained straight line equation~~first alignment error and the second alignment error~~.

33. (Original) The device of claim 32, wherein the reference line, the first comparison line, and the second comparison line are vertically oriented.

34. (Original) The device of claim 32, wherein the reference line, the first comparison line, and the second comparison line are horizontally oriented.

35. (Original) The device of claim 32, wherein only one reference line, one first comparison line and one second comparison line are printed.

36. (Currently Amended) An image alignment error correcting method comprising:

determining image alignment errors based upon a difference between predetermined distances which correspond to spaces between three printed test marks and actual distances between the three test marks, respectively; and

obtaining a straight line equation determined according to the determined image alignment errors and determining a correcting control value to automatically correct for the image alignment errors, based on the obtained straight line equation~~determined image alignment errors~~.